What is claimed is:

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1. A composition comprising a plurality of Ti/Sb mixed oxide nanoparticles in the form of an aqueous colloidal dispersion, wherein the Ti/Sb mixed oxide nanoparticles comprise a rutile-like crystalline phase.

2. The composition of claim 1, wherein the ensemble average nanoparticle size is less than about 100 nanometers.

3. The composition of claim 1, wherein the ensemble average nanoparticle size is less than about 40 nanometers.

4. The composition of claim 1, wherein the weight ratio of titanium to antimony in the nanoparticles is in the range of from about 0.14 to about 11.30.

5. The composition of claim 1, wherein the weight ratio of titanium to antimony in the nanoparticles is in the range of from about 0.22 to about 5.02.

6. The composition of claim 1, wherein the weight ratio of titanium to antimony in the nanoparticles is in the range of from about 0.42 to about 2.93.

7. The composition of claim 1, wherein the ensemble average rutile-like crystalline phase content of Ti/Sb mixed oxide nanoparticles is at least about 20 weight percent.

8. The composition of claim 1, wherein the ensemble average rutile-like crystalline phase content of Ti/Sb mixed oxide nanoparticles is at least about 40 weight percent.

9. The composition of claim 1, wherein the ensemble average rutile-like crystalline phase content of Ti/Sb mixed oxide nanoparticles is at least about 60 weight percent.

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II) 25-37
III) 38-69

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10. The composition of claim 1, wherein the ensemble average rutile-like crystalline phase content of Ti/Sb mixed oxide nanoparticles is at least about 80 weight percent.

11. The composition of claim 1, wherein substantially all of the Ti/Sb mixed oxide nanoparticles contain a rutile-like crystalline phase.

12. The composition of claim 1, wherein the ensemble average rutile-like crystallite size is less than about 20 nanometers.

13. The composition of claim 1, wherein the ensemble average rutile-like crystallite size is less than about 15 nanometers.

14. The composition of claim 1, wherein the nanoparticles have at least one organic moiety bound to the nanoparticle surface.

15. A method for preparing an aqueous colloidal dispersion of Ti/Sb mixed oxide nanoparticles comprising the steps of:

a) providing an aqueous titania precursor;

b) providing an aqueous antimony oxide precursor;

c) combining with mixing both aqueous precursors; and

d) hydrothermally processing the mixture;

wherein the weight ratio of titanium to antimony is in the range of from about 0.14 to about 11.3.

16. The method of claim 15, wherein the aqueous titania precursor is the reaction product of hydrogen peroxide with a titanium alkoxide.

17. The method of claim 16, wherein the titanium alkoxide is titanium tetraisopropoxide.

18. The method of claim 15, wherein the aqueous antimony oxide precursor is selected from a reaction products of an antimony alkoxide with hydrogen peroxide and colloidal $HSb(OH)_6$.

19. The method of claim 18, wherein the aqueous antimony oxide precursor is colloidal $HSb(OH)_6$.

20. The method of claim 15, further comprising the step of modifying the surface of the nanoparticles.

21. The method of claim 15, wherein the pH of the mixture is between about 5 and about 8.

22. The method of claim 15, further comprising the step of centrifuging the hydrothermally processed mixture.

23. The method of claim 15, wherein hydrothermally processing comprises passing the mixture through a stirred tube reactor.

24. The method of claim 23, further comprising the step of centrifuging the hydrothermally processed mixture.

25. A composition comprising agglomerated nanoparticles, wherein the agglomerated nanoparticles comprise Ti/Sb mixed oxide nanoparticles comprising a rutile-like crystalline phase.

26. The composition of claim 25, wherein the ensemble average nanoparticle size is less than about 100 nanometers.

27. The composition of claim 25, wherein the ensemble average nanoparticle size is less than about 40 nanometers.

28. The composition of claim 25, wherein the weight ratio of titanium to antimony in the nanoparticles is in the range of from about 0.14 to about 11.30.

29. The composition of claim 25, wherein the weight ratio of titanium to antimony in the nanoparticles is in the range of from about 0.22 to about 5.02.

30. The composition of claim 25, wherein the weight ratio of titanium to antimony in the nanoparticles is in the range of from about 0.42 to about 2.93.

31. The composition of claim 25, wherein the ensemble average rutile-like crystalline phase content of the Ti/Sb mixed oxide nanoparticles is at least about 20 weight percent.

32. The composition of claim 25, wherein the ensemble average rutile-like crystalline phase content of the Ti/Sb mixed oxide nanoparticles is at least about 40 weight percent.

33. The composition of claim 25, wherein the ensemble average rutile-like crystalline phase content of Ti/Sb mixed oxide nanoparticles is at least about 60 weight percent.

34. The composition of claim 25, wherein the ensemble average rutile-like crystalline phase content of Ti/Sb mixed oxide nanoparticles is at least about 80 weight percent.

35. The composition of claim 25, wherein substantially all of the Ti/Sb mixed oxide nanoparticles contain a rutile-like crystalline phase.

36. The composition of claim 25, wherein the nanoparticles have at least one organic moiety bound to the nanoparticle surface.

37. The composition of claim 25, wherein the agglomerated nanoparticles are redispersible into a liquid vehicle.

38. A nanocomposite precursor comprising a plurality of nanoparticles homogeneously dispersed in an organic binder precursor, wherein the nanoparticles comprise Ti/Sb mixed oxide nanoparticles containing a rutile-like crystalline phase.

39. The nanocomposite precursor of claim 38, wherein the ensemble average nanoparticle size is less than about 100 nanometers.

40. The nanocomposite precursor of claim 38, wherein the ensemble average nanoparticle size is less than about 40 nanometers.

41. The composition of claim 38, wherein the weight ratio of titanium to antimony in the nanoparticles is in the range of from about 0.14 to about 11.30.

42. The composition of claim 38, wherein the weight ratio of titanium to antimony in the nanoparticles is in the range of from about 0.22 to about 5.02.

43. The composition of claim 38, wherein the weight ratio of titanium to antimony in the nanoparticles is in the range of from about 0.42 to about 2.93.

44. The nanocomposite precursor of claim 38, wherein the ensemble average rutile-like crystalline phase content of Ti/Sb mixed oxide nanoparticles is at least about 20 weight percent.

45. The nanocomposite precursor of claim 38, wherein the ensemble average rutile-like crystalline phase content of Ti/Sb mixed oxide nanoparticles is at least about 40 weight percent.

46. The nanocomposite precursor of claim 38, wherein the ensemble average rutile-like crystalline phase content of Ti/Sb mixed oxide nanoparticles is at least about 60 weight percent.

47. The nanocomposite precursor of claim 38, wherein the ensemble average rutile-like crystalline phase content of Ti/Sb mixed oxide nanoparticles is at least about 80 weight percent.

48. The nanocomposite precursor of claim 38, wherein substantially all of the Ti/Sb mixed oxide nanoparticles contain a rutile-like crystalline phase.

49. The nanocomposite precursor of claim 38, wherein the nanoparticles have at least one organic moiety bound to the nanoparticle surface.

50. The nanocomposite precursor of claim 38, wherein the binder precursor comprises a polymerizable material.

51. The nanocomposite precursor of claim 50, wherein the polymerizable material comprises an acrylate monomer or oligomer.

52. The nanocomposite precursor of claim 51, wherein the binder precursor further comprises a photoinitiator or photocatalyst.

53. The nanocomposite precursor of claim 52, wherein the nanoparticles have at least one organic moiety bound to the nanoparticle surface.

54. A nanocomposite comprising a plurality of nanoparticles dispersed in an organic binder, wherein the nanoparticles comprise Ti/Sb mixed oxide nanoparticles containing a rutile-like crystalline phase.

55. The nanocomposite of claim 54, wherein the ensemble average nanoparticle size is less than about 100 nanometers.

56. The nanocomposite of claim 54, wherein the ensemble average nanoparticle size is less than about 40 nanometers.

57. The composition of claim 54, wherein the weight ratio of titanium to antimony in the nanoparticles is in the range of from about 0.14 to about 11.30.

58. The composition of claim 54, wherein the weight ratio of titanium to antimony in the nanoparticles is in the range of from about 0.22 to about 5.02.

59. The composition of claim 54, wherein the weight ratio of titanium to antimony in the nanoparticles is in the range of from about 0.42 to about 2.93.

60. The composition of claim 54, wherein the ensemble average rutile-like crystalline phase content of Ti/Sb mixed oxide nanoparticles is at least about 20 weight percent.

61. The composition of claim 54, wherein the ensemble average rutile-like crystalline phase content of Ti/Sb mixed oxide nanoparticles is at least about 40 weight percent.

62. The composition of claim 54, wherein the ensemble average rutile-like crystalline phase content of Ti/Sb mixed oxide nanoparticles is at least about 60 weight percent.

63. The composition of claim 54, wherein the ensemble average rutile-like crystalline phase content of Ti/Sb mixed oxide nanoparticles is at least about 80 weight percent.

64. The composition of claim 54, wherein substantially all of the Ti/Sb mixed oxide nanoparticles contain a rutile-like crystalline phase.

65. The nanocomposite of claim 54, wherein the nanoparticles have at least one organic moiety bound to the nanoparticle surface.

66. The nanocomposite of claim 54, wherein nanoparticles are present in an amount of at least 30 weight percent of the nanocomposite.

67. The nanocomposite precursor of claim 66, wherein the nanoparticles have at least one organic moiety bound to the nanoparticle surface.

68. The nanocomposite precursor of claim 54, wherein the binder comprises a polymerized acrylate monomer.

69. The nanocomposite precursor of claim 68, wherein the binder further comprises a photoinitiator or photocatalyst.